ثانوية التكنولوجيا التطبيقية
Applied Technology High School

ATHS FC – Math Department Al Ain
Internal Quiz 4 (Term II)

Grade/Cluster	11 core	Chap/Sections	6.5 to 6.8
Section		Date	
Name	Answers	Duration	30 minutes
ID		Score/15	

Q-1 What must be true in order for a term $x - a$ to be a factor of a polynomial f(x)? (1 mark)

A. f (a) = 0
B. $f(a)$ must be negative
C. $f(a)$ must be positive
D. a must be positive

Q-2 Write the expression in quadratic form: $x^6 + 2x^3 - 5$ (1 mark)

$(x^3)^2 + 2(x^3) - 5$

Q-3 Show that x – 3 is a factor of $x^3 + 4x^2 - 15x - 18$ then find the remaining factors of the polynomial (3 marks)

3	1	4	−15	−18
		3	21	18
	1	7	6	0

$x^2 + 7x + 6 = (x + 1)(x + 6)$

$x^3 + 4x^2 - 15x - 18 = (x - 3)(x + 1)(x + 6)$

+ve	-ve	imag	Degree
2	1	0	3
0	1	2	3

Q-4 State the number of positive real zeros, negative real zeros, and imaginary zeros of the function $f(x) = x^3 - 6x^2 + 1$. (3 marks)

$f(x) = \underbrace{x^3 - 6x^2}_{\text{yes}\quad\text{yes}} + 1$

2 or 0 +ve real zeros
1 -ve real zero
2 or 0 imaginary roots

$f(-x) = \underbrace{-x^3 - 6x^2}_{\text{No}\quad\text{yes}} + 1$

Q-5 Find all of the zeros of each function (7 marks)

a) $f(x) = x^3 + x$

$x(x^2+1) = 0$

$x = 0$ or $x^2 + 1 = 0$

$x^2 = -1$

$\sqrt{x^2} = \sqrt{-1} \Rightarrow x = \pm i$

The zeros are $0, i, -i$

b) $f(x) = 4x^4 - 25x^2 + 36$

Tow ways → 1st one $4x^4 - 25x^2 + 36 = 0$

$(x^2 - 4)(4x^2 - 9) = 0$

$x^2 - 4 = 0$ or $4x^2 - 9 = 0$

$x^2 = 4$ $\quad 4x^2 = 9$

$x = \pm 2$ $\quad x^2 = \frac{9}{4}$

$x = \pm \frac{3}{2}$

The zeros are $2, -2, \frac{3}{2}, -\frac{3}{2}$

2nd way: step1: Degree 4 ⇒ 4 roots

step2: $p = \pm 1, \pm 2, \pm 3, \pm 4, \pm 36, \pm 18, \pm 12, \pm 9, \pm 6$

$q = \pm 1, \pm 2, \pm 4$

$\frac{p}{q} = \pm 1, \pm 2, \pm 3, \pm 4, \pm 36, \pm 18, \pm 12, \pm 9, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm 6, \pm \frac{9}{2}, \pm \frac{1}{4}, \pm \frac{3}{4}, \pm \frac{9}{4}$

step3: $f(x) = \underbrace{4x^4 - 25x^2}_{\text{yes}\quad\text{yes}} + 36$

2 or 0 +ve real roots.

$f(-x) = \underbrace{4x^4 - 25x^2}_{\text{yes}\quad\text{yes}} + 36$

2 or 0 -ve real roots.
4, 2, or 0 imaginary roots.

step4:

2	4	0	-25	0	36
		8	16	-18	-36
	4	8	-9	-18	0

$4x^3 + 8x^2 - 9x - 18 = 0$

$4x^2(x+2) - 9(x+2) = 0$

$(x+2)(4x^2 - 9) = 0$

$x + 2 = 0$ $\quad 4x^2 - 9 = 0 \Rightarrow 4x^2 = 9$

$x = -2$ $\quad x^2 = 9/4$

$x = \pm 3/2$

step5: The zeros are $2, -2, 3/2, -3/2$

+ve	-ve	imag	Deg
2	2	0	4
2	0	2	4
0	2	0	4
0	0	4	4